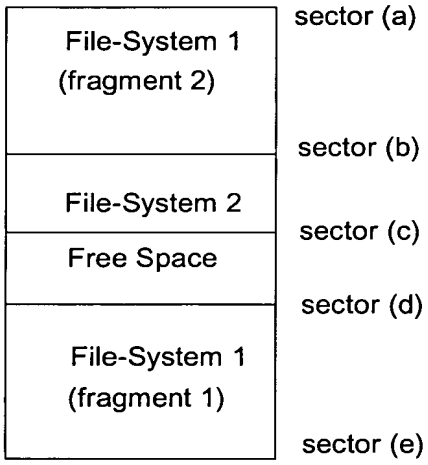
File-System 1
(fragment 2)
sector (a)
sector (b)
File-System 2
sector (c)
Free Space
sector (d)
File-System 1
(fragment 1)
sector (e)
flash bank "i"

FIG. 1

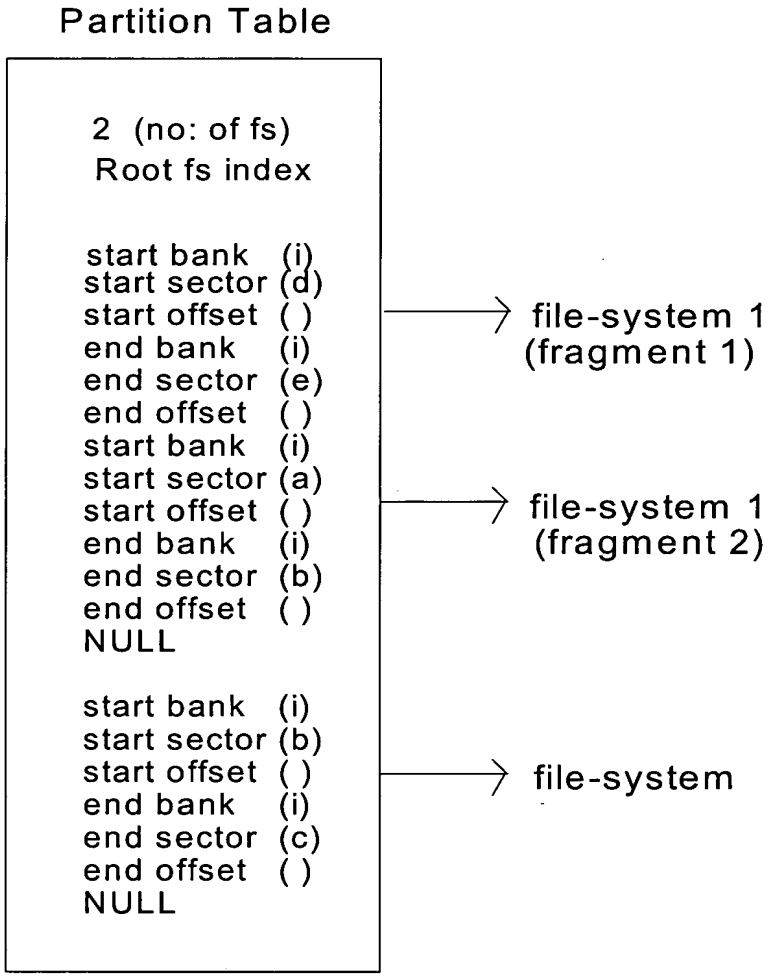
Partition Table
2 (no: of fs)
Root fs index
start bank (i)
start sector (d)
start offset ( )
end bank (i)
end sector (e)
end offset ( )
start bank (i)
start sector (a)
start offset ( )
end bank (i)
end sector (b)
end offset ( )
NULL
start bank (i)
start sector (b)
start offset ( )
end bank (i)
end sector (c)
end offset ( )
NULL
file-system 1
(fragment 1)
file-system 1
(fragment 2)
file-system

FIG. 2

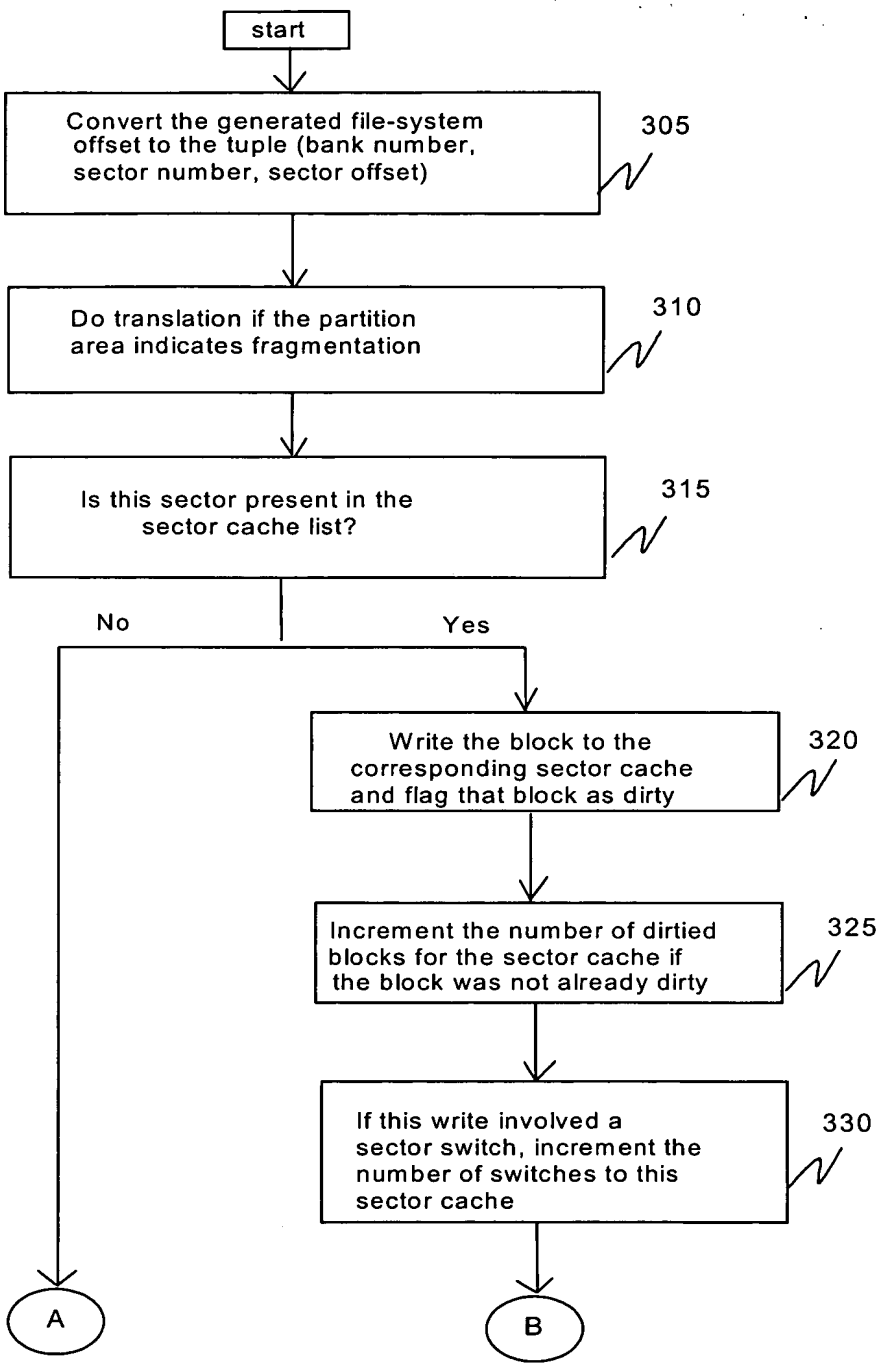
start
Convert the generated file-system offset to the tuple (bank number, sector number, sector offset)
305
Do translation if the partition area indicates fragmentation
310
Is this sector present in the sector cache list?
315
No
Yes
Write the block to the corresponding sector cache and flag that block as dirty
320
Increment the number of dirtied blocks for the sector cache if the block was not already dirty
325
If this write involved a sector switch, increment the number of switches to this sector cache
330
A
B

FIG. 3A

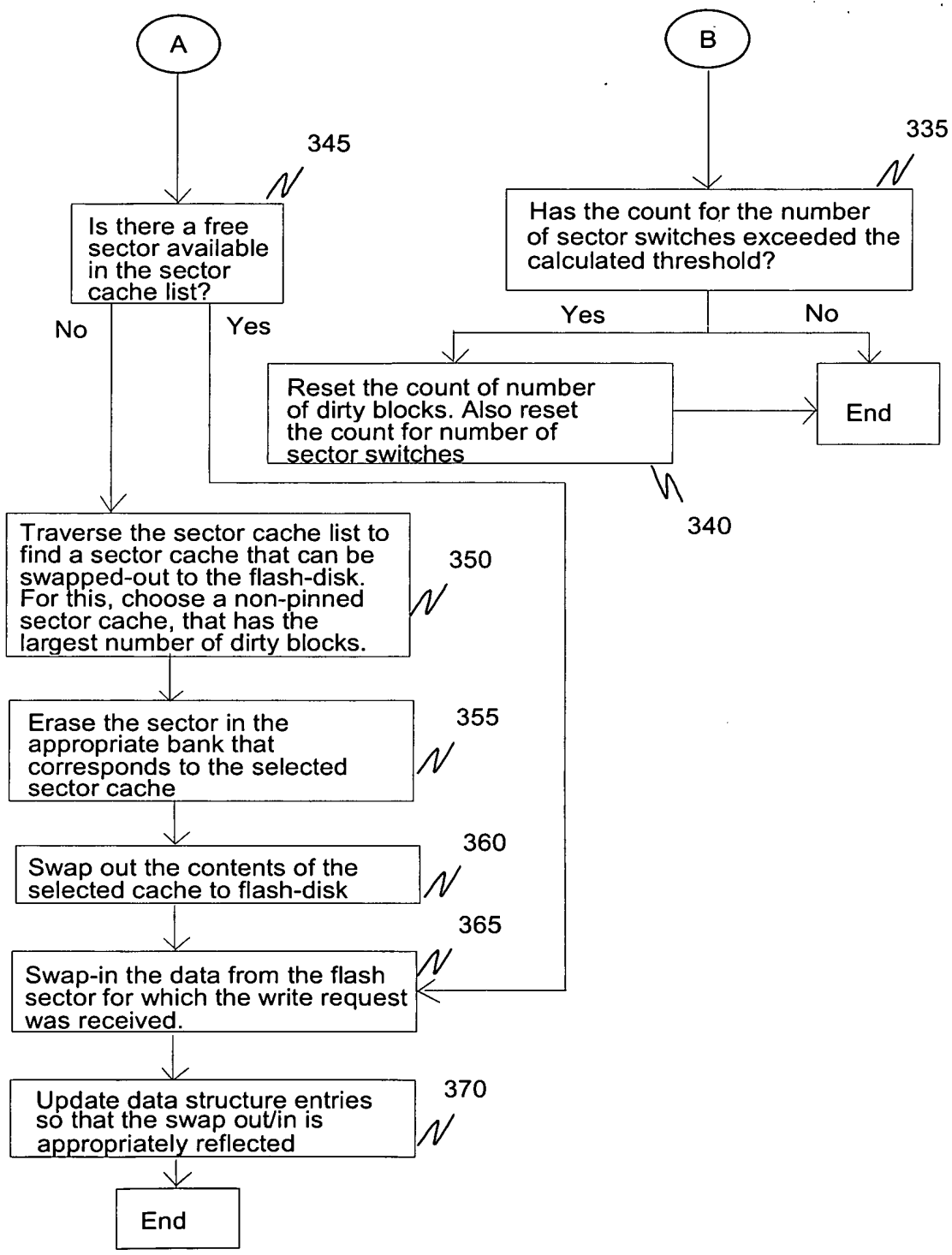
A
B
345
335
Is there a free sector available in the sector cache list?
Has the count for the number of sector switches exceeded the calculated threshold?
No
Yes
Yes
No
Reset the count of number of dirty blocks. Also reset the count for number of sector switches
End
340
Traverse the sector cache list to find a sector cache that can be swapped-out to the flash-disk. For this, choose a non-pinned sector cache, that has the largest number of dirty blocks.
350
Erase the sector in the appropriate bank that corresponds to the selected sector cache
355
Swap out the contents of the selected cache to flash-disk
360
Swap-in the data from the flash sector for which the write request was received.
365
Update data structure entries so that the swap out/in is appropriately reflected
370
End

FIG. 3B

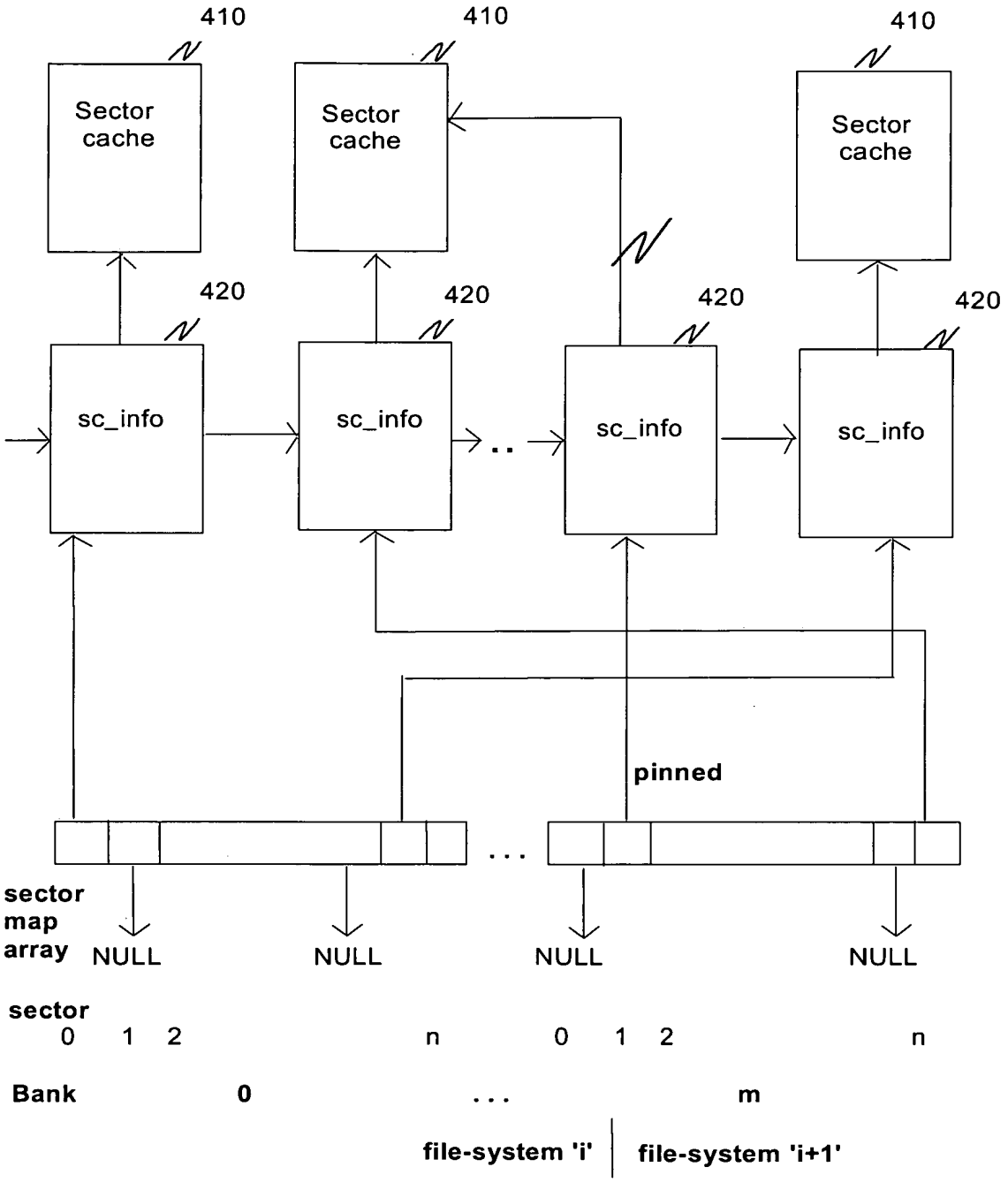
410
410
410
Sector cache
Sector cache
Sector cache
420
420
420
420
sc_info
sc_info
sc_info
sc_info
pinned
sector map array
NULL
NULL
NULL
NULL
sector
0 1 2 n 0 1 2 n
Bank 0 ... m
file-system 'i'
file-system 'i+1'

FIG. 4

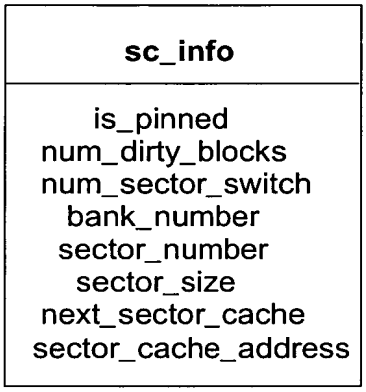
sc_info
is_pinned
num_dirty_blocks
num_sector_switch
bank_number
sector_number
sector_size
next_sector_cache
sector_cache_address

FIG. 5

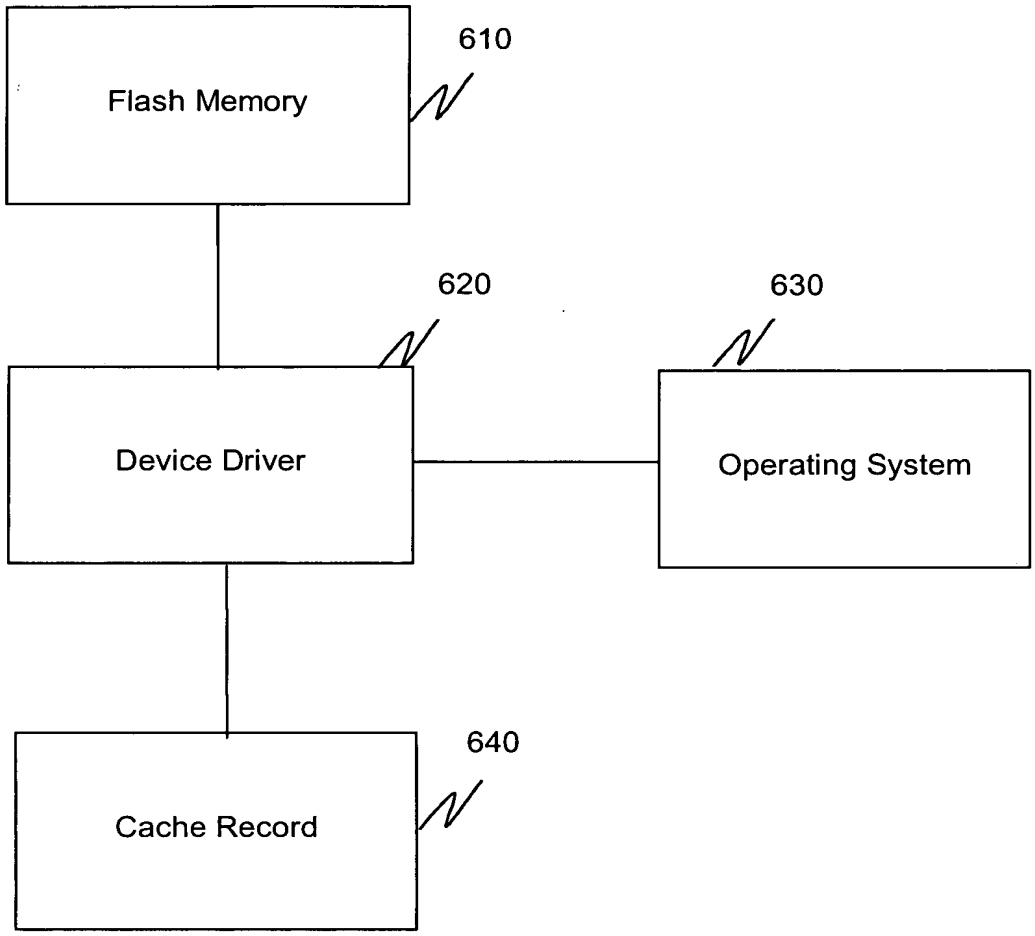
Flash Memory
610
620
630
Device Driver
Operating System
640
Cache Record

FIG. 6

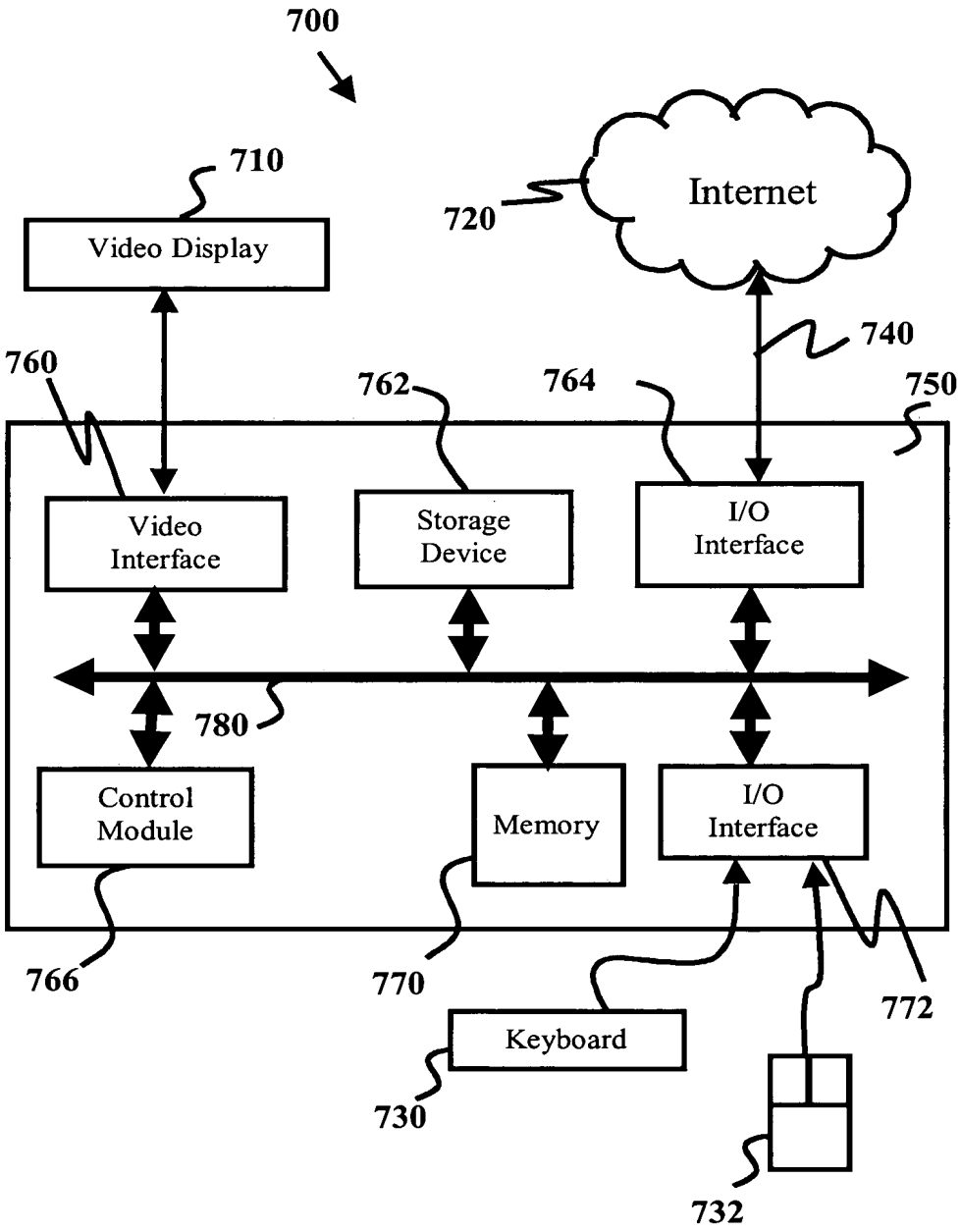
700
710
Video Display
720
Internet
740
760
762
764
750
Video Interface
Storage Device
I/O Interface
780
Control Module
Memory
I/O Interface
766
770
772
Keyboard
730
732

FIG. 7